

ANSWERS: Crystal Ball: Identifying organic substances

1) Carry out the following tests

1st: add red litmus paper to each test tube of colourless solutions

Observation: the 1-aminoheptane will turn red litmus paper a blue colour

2nd: add blue litmus paper to the remaining three test tubes of colourless solutions

Observation: the hexanoic acid will turn blue litmus a red colour

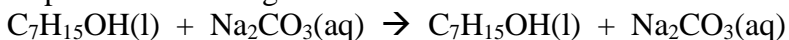
3rd: add a few mL's of water to the remaining two test tubes

Observation: the cyclohexane is immiscible with water so will float on top of the water and be seen as a separate layer

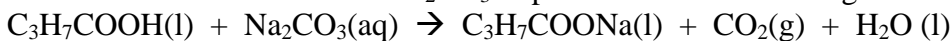
4th: the remaining test tube contains hexan-2-ol

2) Add a few mL's of Na₂CO₃(aq) to each of the solutions.

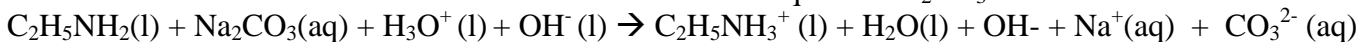
Heptan-1-ol is a long chain alcohol and does not dissolve in the aqueous Na₂CO₃



butanoic acid will react with Na₂CO₃ to produce carbon dioxide gas so bubbling will be observed



aminoethane is a short chain amine and will dissolve in the aqueous Na₂CO₃



3) Firstly, the reaction of each of the substances with potassium permanganate KMnO₄

Propanoic acid

There is no colour change because the propanoic acid cannot be oxidised further

Ethanol

The colour change is from purple to colourless because the ethanol (a primary alcohol) is oxidised to ethanoic acid

The equation for the reaction is:



but-2-ene

The colour change is from purple to colourless because the but-2-ene is oxidised to butan-2,3-diol

The equation for the reaction is



Secondly, the reaction of each of the substances with potassium dichromate K₂Cr₂O₇

Propanoic acid

There is no colour change because the propanoic acid cannot be oxidised further

Ethanol

The colour change is from orange to green because the ethanol (a primary alcohol) is oxidised to ethanoic acid

The equation for the reaction is:



but-2-ene

The colour change is from orange to green because the but-2-ene is oxidised to butan-2,3-diol

The equation for the reaction is

